

# Energy Efficient Electroactive Polymers and Electroactive Polymer Devices

## ABSTRACT OF THE DISCLOSURE

5       The present invention relates to polymers that convert between electrical and mechanical energy. When a voltage is applied to electrodes contacting an electroactive polymer, the polymer deflects. This deflection may be used to do mechanical work. Similarly, when a previously charged electroactive polymer deflects, the electric field in the material is changed. The change in electric field may be used to produce electrical energy.

10    An active area is a portion of a polymer having sufficient electrostatic force to enable deflection of the portion and/or sufficient deflection to enable a change in electrostatic force or electric field. The present invention relates to energy efficient transducers and devices comprising multiple active areas on one or more electroactive polymers. The invention also relates to methods for actuating one or more active areas on one or more electroactive

15    polymers while maintaining a substantially constant potential energy.